REMARKS

Claims 1-3

In the Office Action, claims 1-3 were rejected as being obvious from Sugawara et al.(U.S. Patent No. 6,501,610, hereinafter Sugawara) in view of Bliss et al.(U.S. Patent No. 6,216,249, hereinafter Bliss).

Under claim 1 an equalization target is identified for a channel by measuring a goodness metric for first and second candidate targets by reading data through the channel. The goodness metrics are compared to each other and the candidate target with the better measure is selected. The selected target is then modified to improve the measure of the goodness metric.

The combination of Sugawara and Bliss does not show or suggest the invention of claim 1. In particular, neither Sugawara nor Bliss shows or suggests selecting an initial target from two targets and then modifying the target to improve a measure of a goodness metric.

In the Office Action, it was asserted that Bliss showed this limitation in Column 7, lines 6-65. Applicants respectfully dispute this assertion.

In the cited section, Bliss is discussing the operation of Viterbi detectors. Such detectors include an Add-Compare-Select (ACS) circuit. The purpose of these circuits is to determine which of two paths into each state of a Viterbi trellis is the most likely path into the state. To do this, a branch metric is calculated for each path into a state. This branch metric is the "Euclidean error metric" formed by "squaring the difference between the actual signal samples x_k 44 and the ideal partial response values." (Bliss, col. 7, lines 15-17). The ideal partial response values are based on a single equalization target, such as PR4.

The memories that are modified in Bliss are not equalization targets. Instead, the memories contain the accumulated branch metrics for each path into each state at a current time point. The equalization target, such as PR4, is not modified in Bliss. Once selected, the equalization target is never modified. Changing the accumulated branch metrics stored in memory is not at all similar to changing an equalization target.

Since Sugawara and Bliss do not mention modifying a selected target to improve a measure of a goodness metric, their combination does not show or suggest the invention of claim 1 or claims 2 and 3, which depend therefrom.

Claims 5, and 7-10

Claims 5 and 7-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sugawara in view of Bliss and further in view of Sawaguchi et al. (U.S. Patent No. 5,539,588, hereinafter Sawaguchi).

Claims 5 and 7-10 are patentable over the combination of Sugawara, Bliss and Sawaguchi because none of these references show or suggest selecting one of two candidate targets and then modifying the candidate target to improve a measure of a goodness metric. As discussed above for claim 1, Sugawara and Bliss do not show such a limitation. Similarly, Sawaguchi does not show this limitation.

In addition, claim 7 is further patentable over Sugawara, Bliss and Sawaguchi. Under claim 7, the candidate target, which is constrained to have a spectral null, is modified so that it no longer has the spectral null. None of Sugawara, Bliss or Sawaguchi show this limitation.

In the Office Action, it was asserted that Sawaguchi shows this limitation at column 3, lines 34-52. However, the cited section makes no mention of modifying an equalization

target and specifically does not show modifying an equalization target that has a spectral null to form an equalization target that does not have the spectral null. As such, claim 7 is further patentable over the cited art.

Claims 8, 9 and 10 are also further patentable over the cited references. Under claim 8, the equalization target is modified by sequentially adjusting single terms in the target. Under claim 9, the equalization target is modified by increasing all of the terms in the target at the same time. Under claim 10, the equalization target is modified by sequentially changing pairs of terms. The combination of Sugawara, Bliss and Sawaguchi does not show or suggest any of these techniques for modifying the equalization target.

In the Office Action, column 9, lines 10-25 of Sugawara were cited as showing these modifications to the equalization target. However, the cited section does not show any of these techniques for modifying an equalization target. Instead, the cited section discusses the adaptation of a filter to meet the requirements set by an equalization target. Although the cited section discusses changing filter coefficients, it does not show or suggest that an equalization target can or should be changed by sequentially changing single terms, or by changing all terms at the same time, or by sequentially changing pairs of terms. As such, the combination of Sugawara, Bliss and Sawaguchi does not show or suggest the invention of claims 8, 9 and 10.

Claims 11 and 12

Claims 11 and 12 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sugawara in view of Bliss and further in view of Sridharan ("A 110 MHz 350 mW 0.6μ CMOS 16-State Generalized-Target Viterbi Detector for Disk Drive Read Channels").

The combination of Sugawara, Bliss and Sridharan does not show or suggest the invention of claims 11 or 12. In particular, none of the references counts the number of times an equalization target was identified for a head or a head/zone pair and then selects the equalization target that was identified for the most heads or head/zone pairs.

In the Office Action, it was asserted that Sridharan shows this limitation on page 367, column 1. However, the cited section does not mention counting the number of times equalization targets were identified. Instead, the cited section discusses determining equalization target values for each head, where a target value is the read signal that is generated by the head given a target. Thus, each head has the same target, however, due to fluctuations in the performance of the head, the read signals will differ from head to head. Thus, the cited section does not involve determining equalization targets for a head but instead involve determining expected read signal values given a target. Further, the cited section makes no mention of counting the number of times a target is identified or selecting a target that is identified for the most heads or head/zone pairs. As such, claims 11 and 12 are patentable over Sugawara, Bliss and Sridharan.

Claims 15-18

Claims 15-18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sugawara in view of Cideciyan et al. (U.S. Patent No. 6,377,635, hereinafter Cideciyan).

Under claim 15, an equalization target is formed by searching through a plurality of candidate equalization targets that satisfy a spectral null constraint to locate an initial equalization target that provides a best goodness measure. The initial equalization target is then adjusted so that it no longer satisfies the spectral null constraint.

The combination of Sugawara and Cideciyan does not show or suggest the invention of claim 15. In particular, the combination does not show adjusting an initial equalization target that satisfies a spectral null so that it no longer satisfies the spectral null.

In the Office Action, it was asserted that column 3, lines 23-43 of Cideciyan show this adjustment step. However, the cited section does not mention adjusting an equalization target. Instead, it discusses opitimizing a Viterbi detector given "an arbitrary generalized partial-response target". It does not mention adjusting an initial equalization target that satisfies a spectral null constraint so that it no longer satisfies the spectral null constraint. It simply discusses how to efficiently calculate a branch metric given an equalization target. There is simply no statement in Cideciyan that it is adjusting a target so that it does not satisfy a spectral null constraint.

Since neither Sugawara nor Cideciyan adjust a target that satisfies a spectral null constraint so that it does not satisfy the spectral null constraint, the combination of these references does not show or suggest the invention of claims 15-18.

Claims 20 and 21

Claims 20 and 21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sugawara in view of Cideciyan and further in view of Sridharan.

Under claims 20 and 21, a separate equalization target is formed for each head or each head/zone pair. A count of the number of times each equalization target is formed is made. The target that is formed for the most heads or head/zone pairs is selected as the equalization target for the channel.

The combination of cited references does not show or suggest the invention of claims 20 and 21. In particular, none

of the references show a step of counting the number of times each equalization target is formed. As such, claims 20 and 21 are patentable over the cited combination.

Claims 22 and 25

Claims 22-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Sugawara in view of Cideciyan.

Claim 22 provides a method for selecting an equalization target. Under the method, a spectral null constraint is selected. An initial equalization target is then selected from a plurality of targets that satisfy the spectral null constraint. The initial equalization target is then adjusted so that it no longer satisfies the spectral null constraint.

As noted above, neither Sugawara nor Cideciyan show or suggest adjusting an equalization target that satisfies a spectral null constraint so that it no long satisfies the spectral null constraint. As such, claim 22 and claim 25 are patentable over the cited combination.

Conclusion

In light of the above remarks, claims 1-3, 5, 7-22 and 25 are patentable over the cited art. Reconsideration and allowance of the claims is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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